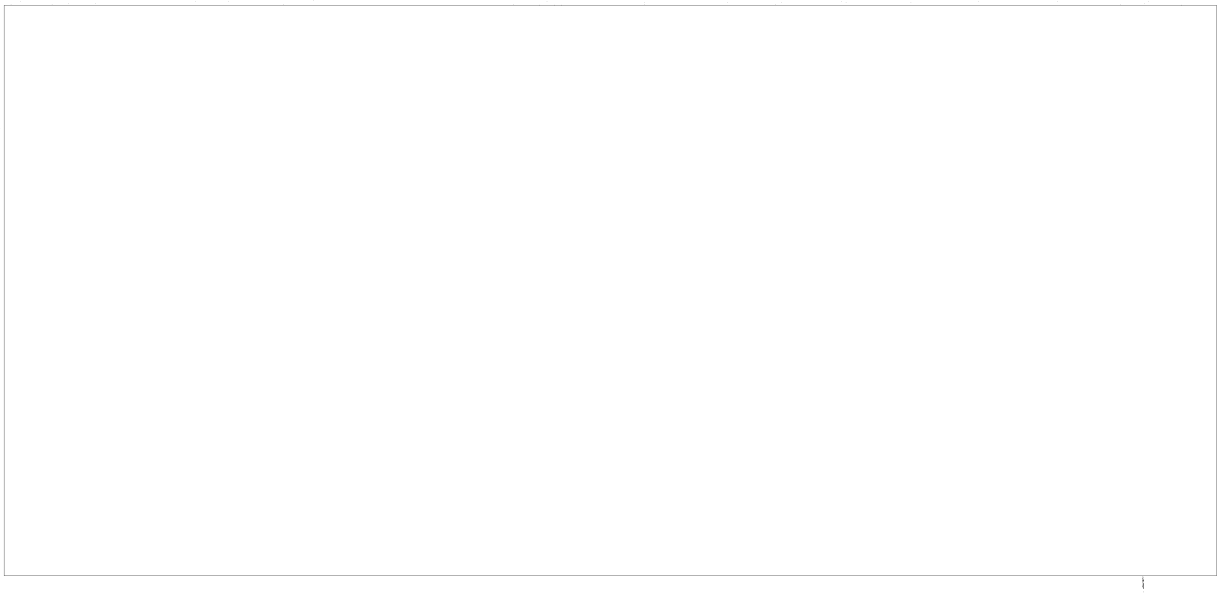

"A New Method for the Delineation of Seismic Regions"

Vestnik Akademii Nauk SSSR, Volume XX, No 10,
pages 107-108; Moscow-Leningrad; October 1950;
Editorial Staff.

A NEW METHOD FOR THE DELINEATION OF SEISMIC REGIONS

[NOTE: The following report appeared in the regular "New Scientific Works" section of the journal Vestnik Akademii Nauk SSSR, Volume 20, No 10, October 1950, pages 107-108. It was written by the editorial staff.]

The demarkation of locations subject to destructive earthquakes is an important problem of the State, the solution of which is essential in the planning of buildings in seismic regions.

Seismic regions in the territory of the USSR have several seismic foci that are active periodically, the intervals of activity varying from several years to centuries (100 - 500 years), and even more. More or less detailed seismic data on these regions are available only for time intervals of 50 to 100 years; and for longer time intervals, only in some ancient cities. Therefore seismic maps compiled according to available statistical materials reflect unevenly the seismology of the USSR. In regions where earthquakes have been recorded, the seismic conditions are more or less clarified; but regions where the foci of distrubances have been temporarily quiet, remained unrevealed and hence their seismic conditions are unknown. Such unclarified regions constitute the majority of seismic areas. This is the reason for the unexpectedness of some destructive earthquakes (as happened in Chatkal and Kazandzhik in 1946, and in Ashkabad in 1948, and other locations).

Because of the situation expounded above, it has been found imperative to exploit methods for the compilation of maps that delineate seismic area and indicate all locations of possible strong earthquakes, independently of whether or not underground concussions have been felt in the regions in question. The same maps should designate the strength and propagation of the strongest earthquakes and clarify the possible probability of a recurrence.

The senior scientist of the Geophysical Institute, Academy of Sciences USSR, I. Ye. Gubin has developed and proposed a seismotectonic method of seismic delineation for the compilation of just such maps.

The factual material for the development of the new method are: (a) the results of researches into gelogical structures and geological proclivities and tendencies towards earthquakes, which results have been processed by many Russian scientists, and also (b) the result of I. Ye. Guvin's own works, who for the last 20 years has been studying the consequences of 12 destructive earthquakes on the territories of Middle Asia and the character of the development of geological structures toward which earthquakes are disposed.

The basic conclusions reached by I. Ye. Gubin are the following:

1. In most seismic regions of the USSR the strongest earthquakes are associated with tectonic motions along cracks in the terrestrial crust, having their origin in the development of geological structures. During such earthquakes the greatest destruction occurs in the vicinity of active cracks. The latter develop not everywhere, but only in certain zones.

2. In regions possessing different geological structures the earthquakes too differ in: (a) the areas subjected to destruction, (b) the shape and orientation of these areas, (c) recurrences, etc.

3. Different earthquakes are associated with different types of cracks and vice-versa; namely, cracks of various types possess various seismogenetic characters. Therefore, an earthquake is an indicator of not only the intensity, but also the form of development of geological structures.

This close interration between seismic phenomena and developmental processes in the terrestrial crust enables us, by means of studies of geological structures and, in particular, of tectonic motions, to delineate cracks along which earthquakes appear systematically, independently of whether or not any earthquakes have

been recorded there. Also, earthquakes possessing (a) different strengths and (b) different areas of influence will be associated with different types of cracks.

I. Ye. Gubin carried out a seismogenetic classification of Tadzhikistan and compiled a seismotectonic map of Garmskaya Oblast. In many sections of Garmskaya Oblast earthquakes of remote origin had been recorded, but the sources of strong earthquakes in this territory were unknown. However, by applying the method developed by him, I. Ye. Gubin was able to reveal that active sources exist in certain locations of these sections and that destructive underground shocks may occur. On the map that he compiled in 1948, he underlined locations where destructions may occur -- and indeed in one of these locations a strong earthquake did occur in 1949; Also, he has revealed that in another section earthquakes had occurred previously.

These facts demonstrate to us that by applying I. Ye. Gubin's method to the compilation of corresponding maps of many other seismic territories of the Soviet Union we may reveal most of the temporarily unknown, but existing seismic sources which may endanger densely populated areas and industrial centers by strong underground shocks and, which should be taken into account in building projects. At the same time we may discover, by Gubin's method, practically safe locations where seismogenetic cracks do not occur.

- E N D -